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U.S. Army Corps of Engineers
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1 April 1993

Engineering and Design
DEVELOPMENT OF DROUGHT CONTINGENCY PLANS

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Engineering and Design DEVELOPMENT OF DROUGHT CONTINGENCY PLANS

1. Purpose

This Engineer Technical Letter (ETL) provides guidance for developing and updating Drought Contingency Plans (DCP) within existing authorities for developing water control plans.

See: 3. References.

2. Applicability

This ETL applies to all HQUSACE elements, major subordinate commands, districts, laboratories and field operation activities (FAO) having civil works projects.

3. References

- a. ER 1105-2-100, Guidance for Conducting Civil Works Planning Studies.
- b. ER 1110-2-1941 Drought Contingency Plans.
- c. EM 1110-2-3600, Management of Water Control Systems.
- d. ETL 1110-2-251, Guide for Preparing Water Control Manuals.

Additional sources of information are cited in the Bibliography (Enclosure 1).

4. Need for Drought Contingency Plans

Drought Contingency Plans are an important part of the operational guidance for all Corps water control projects with the potential for providing useful service during times of drought (ref 3.c). This service is generally related to water management activities that can be provided by the project and, therefore, usually

the need for DCP only exists at projects with controllable storage. DCP are prepared either for individual projects or for river basins with several projects that can interact for drought management.

5. Background

DCP were identified as a material weakness in the Army in 1988. As a result of that identification and the clear need to have adequate plans for the use of Corps water control projects to address drought situations, a major effort was initiated to develop DCP for all projects where these plans did not already exist. This effort was concluded at the end of fiscal year 1992 when all projects had approved DCP in place. Review and revision of DCP will continue on an as needed basis as a part of the normal development and revision process for Corps water control manuals.

6. Requirements for Water Control Manual

DCP are a part of the Water Control Manual. They can exist as a physical part of the manual or as an external appendix to the manual. If the DCP are not physically a part of the water control manual, a paragraph within the text of the manual must identify the DCP, indicate plan location and include the monitoring requirements (level I) that indicate the onset of drought conditions. This paragraph must provide a logical sequence that clearly indicates when drought contingency actions must be initiated (see reference 3.d).

7. Drought Contingency Plan Objectives

The DCP objective is to portray clear, well thought out and coordinated plans that describe procedures for dealing with any drought situation that might affect operational management decisions of Corps

projects or the use of storage during drought situations. The DCP is not a cookbook for drought management; it should be a general guide that allows for dynamic management of projects, or systems of projects, to address drought needs. The most important features of DCP are:

- a. Monitoring.* The description of the monitoring requirements for the initial action (trigger for implementation of DCP),
- b. Identification.* The identification of opportunities or actions that can be taken to manage drought situations,
- c. Implementation mechanisms.* The establishment of a mechanism to use opportunities or implement actions,
- d. Coordination.* The identification of communicants, methods, and schedule of coordination with other agencies and organizations (so important when facing a crisis), and
- e. Standard Contract.* The development of a standard (ready to execute) contract for sale or use of project resources during drought situations. This should include a description of how cost will be determined and any known costs for use of Corps storage at the project.

It is essential that DCP are complete and immediately implementable plans that address all potential opportunities of resource management during a drought situation.

8. Development of Drought Contingency Plans

a. General considerations. The development of DCP should be a comprehensive evaluation of a project's ability to address any aspect of drought. It should not be limited to water supply issues but should include water quality, environmental, fire protection, industrial, recreational, power, navigation and other beneficial uses. Within the Corps discretionary limits, deviations from the existing (prior to the development of the DCP) water control plan are a natural part of DCP. In extreme events it

is appropriate to substantially alter the operation of a project or group of projects to address drought related needs. In less significant events appropriately less alteration of normal project operation is expected. It is also appropriate, with full and careful consideration, to temporarily readjust the priorities of operation to address drought needs. Any deviation not covered in the existing operating plan should be handled through a request for deviation to the appropriate division office.

b. Scheduling. Unlike flooding, the onset of drought is a slow process and there is time to plan the most effective method to deal with the individual event. This gradual development process for droughts allows time to prepare appropriate environmental documentation to address the specific action recommended. Generally, event specific environmental documentation is preferred. It is less costly and will address issues germane to the event with up-to-date information. It should be noted, however, that the DCP is a part of the water control plan and should need no special environmental treatment. If existing environmental documentation does not cover the water control plan, it should be developed to cover those plans.

c. Environmental impacts. In the process of developing DCP it has become evident, in some cases, that DCP development may require an environmental assessment prior to plan implementation. This is generally not the case, but in those situations where it is a requirement, those aspects of this process that require long preparation time should be carried out as soon as possible so that, in the event of a drought, the management of the project is not limited by the absence of environmental impact documentation.

9. Public Involvement

With the passage of the Water Resources Development Act of 1990 (WRDA90) public involvement became a requirement in the development of and modification to water control manuals (section 310.b. WRDA90). Some DCP fall under the requirements of WRDA90. DCP that were approved before the passage of WRDA90 do

not require public involvement. DCP that were approved after the passage of WRDA90 and result in a change of the water control plan must comply with WRDA90.

10. Additional Guidance for Drought Contingency Plan Preparation

a. Editorial. The editorial guidance presented in reference 3.d may be useful for preparation of DCP. In general, duplication of materials and information in the water control manual should be avoided in DCP. In those situations where DCP are separate stand-alone appendices of water control manuals, appropriate material from the water control manual must be included in the DCP.

b. Contents. The guidance outline in enclosure 2 may be used in the preparation of DCP. It is not necessary to follow the outline exactly, but it is essential that the basic components of the outline be covered in the DCP. CESWD's "Drought Contingency Plan (SWD Framework)", included as enclosure 3, is an example of one division's efforts to develop a standardized DCP format for projects in their area. It is offered only as an example not as a form to be followed.

11. DCP Revisions and Updates

All DCP should be modified to meet the requirements of this ETL in the normal process for updating water control manuals.

FOR THE DIRECTOR OF CIVIL WORKS:

3 Encl



PAUL D. BARBER, P.E.
Chief, Engineering Division
Directorate of Civil Works

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- a. US Army Corps of Engineers (USACE), 1992. "Authorized and Operating Purposes of Corps of Engineers Reservoirs," July 1992.
- b. USACE, Hydrologic Engineering Center (HEC). 1986. "Reservoir Operation During Drought: Case Studies," Research Document No. 25, August 1986.
- c. USACE, HEC. 1990. "Opportunities to Modify Reservoir Operations to Respond to Drought," Research Document No. 34, June 1990.
- d. USACE, HEC. 1990. "Modifying Reservoir Operations to Improve Capabilities for Meeting Water Supply Needs During Drought," Research Document No. 31, December 1990.
- e. USACE, HEC. 1990. "A Preliminary Assessment of Corps of Engineers' Reservoirs, Their Purposes and Susceptibility to Drought," Research Document No. 33, (also published as: IWR Report 91-NDS-2), December 1990.
- f. USACE, Institute for Water resources (IWR), 1991. National Study of Water Management During Drought, "Report on the First Year of Study," IWR Report 91-NDS-1.
- g. USACE, IWR, 1991. "An Assessment of What is Known About Drought," IWR Report 91-NDS-3.

GUIDANCE OUTLINE FOR DROUGHT CONTINGENCY PLANS

DROUGHT CONTINGENCY PLAN (DCP) FOR PROJECT OR BASIN

TABLE OF CONTENTS

<u>PARAGRAPH/SECT.</u>	<u>TITLE</u>	<u>NOTES</u>
SECT. I 1-01	INTRODUCTION Purpose	If DCP is an appendix to the water control manual, there must be a paragraph in the manual about the DCP, its location and 1st level of action
SECT. II 2-01	AUTHORITIES Authorities	Reference all pertinent ER's, EM's, ETL's, DR's, laws, significant correspondence, etc. (Not needed if DCP is part of manual and manual includes this information.)
SECT. III 3-01	DROUGHTS Historical	Describe past events, include frequency table if available.
3-02	Drought Indicators	Describe a severe drought, note parameters that are indicators of onset of drought conditions. Identify a predictive monitoring process to provide the best possible advance warning of an impending drought so that appropriate advance measures can be taken.
SECT. IV	BASIN/PROJECT DESCRIPTION	Not needed if DCP is part of a Manual that addresses this material.

4-01	Basin Description	Include upstream and downstream description of basin, including natural and development features that may be impacted by the project's management. Include constraints on project operation
4-02	Project Description	Include physical and contractual constraints or commitments, i.e. intake elevations, recreation facilities, environmental resources, water supply, irrigation, navigation, hydropower agreements, etc.
SECT. V	WATER USES & USERS	
5-01	Current Uses & Users	Describe use and users of waters and storage, differentiate between uses and authorized purposes, list uses and users. Include water rights and priorities if applicable. (Not needed if manual addresses these facets and the DCP is part of the manual.)
5-02	Potential Uses & Users	Describe potential uses & users of project resources for drought management. List potential uses & users. Include estimated volumes for each.
5-03	Available Storage	Identify all storage that could potentially be made available for drought service. Include the full use of the Corps discretionary authorities for water management and obligation to address human health and safety.
SECT. VI	CONSTRAINTS	
6-01	Constraints	Identify legal and institutional constraints, contracts, water rights, operating procedures by river authorities or other entities, agreements, etc.

SECT. VII

DROUGHT
MANAGEMENT PLAN

7-01	General	Briefly describe basic plan, including action levels, coordination, contracts, anticipated actions, technical procedures, information dissemination and responsibilities
7-02	Level I	Monitoring for early warning signs of impending drought. Describe process and trigger point(s) for moving to Level II.
7-02	Level II	Continue and intensify monitoring, activate Corp's Drought Management Committee (CDMC). Take advance Water Control (WC) actions and deviations necessary to prepare for drought. Take water control management measures to address initial impacts of drought. Notify higher authority. Describe process, actions, likely deviations, responsibilities, etc. Identify trigger point(s) for moving to Level III.
7-03	Level III	Activate Interagency Drought Management Committee (IDMC). Coordinate and communicate with users, public and media. Identify needs, priorities and actions for most beneficial use of available resources. Continue and increase Level I and II activities, as appropriate. Describe process, responsibilities, and actions. Determine trigger point(s) for Level IV.
7-04	Level IV	Describe circumstance where basic human needs are threatened, other Non-Federal resources are exhausted or nearly exhausted, and resources from the Federal projects for drought emergency use are in great demand. Levels I, II and III activities continue.

Rationing and apportionment may be required to maintain critical water uses.

7-05	Corps Drought Management Committee	Describe the function, composition, and committee responsibility of the CDMC. The CDMC should be an interdisciplinary technical committee that includes representatives from all organizational elements that will play a part in drought management. This committee should report directly to the District Engineer and coordinate all District drought management activities. An active list of members should be included. The CDMC should meet annually with the IDMC, unless there is a drought.
7-06	Interagency Drought Management Committee	Describe this committee in terms similar to Paragraph 7-05. The IDMC should be a broad-based committee that represents a wide range of Federal, State and local interests. The IDMC identifies needs and priorities, and provides information to the District Engineer.

SECT. VIII

INTERAGENCY COORDINATION AND PROCEDURES

8-01	Internal Coordination	This section describes some of the basic coordination, both internal and external, to the Corps. It also describes the technical process and requirements for executing drought actions and contracts.
8-02	External, Interagency Coordination	
8-03	Technical Procedures	

8-04	Contracts	Include a sample of a fully implementable contract for the sale or use of water that may be available to address drought situations.
SECT. IX	PUBLIC INFORMATION	Describe the process for dissemination of information. Establish single point of contact. Prepare advance statements for the media and public.
SECT. X	RESPONSIBILITY	Describe DCP preparation directive and authority. Indicate that District Water Control section is responsible for preparation, revision and implementation of this DCP and approval is at the Division level.

DROUGHT CONTINGENCY PLAN

(SWD Framework)

I. INTRODUCTION

1-01. Purpose of Document. The purpose of this Drought Contingency Plan (DCP) is to provide a basic reference for water management decisions and responses to water shortage in the (*name of basin(s)*) induced by climatological droughts. As a water management document, it is limited to those drought concerns relating to water control management actions. Because of the long-term nature of a drought and the specific problems that may result, this document details only limited number of specific actions that can be carried out related to water control. Its primary value is in documenting data needed in decisions and defining the coordination needed to manage the district's water resources to ensure that they are used in a manner consistent with the needs which develop. This Drought Contingency Plan is Appendix (*No. of Appendix*) to (*Name of Basin*) Master Manual Dated _____. It covers (*list projects*) in the (*name of basin*) Basin.

II. AUTHORITIES

2-01. Authorities - *Include from the following list those authorities that are pertinent to the preparation of drought contingency plans and actions directed therein.*

a. PL 84-99. "Emergency Supplies for Clean Drinking Water" as amended by PL 95-91. This law provides the authority under which the Chief of Engineers may under certain statutory conditions construct wells and transport water to farmers, ranchers, and political subdivisions within areas determined to be drought distressed.

b. Section 216, Public Law 91-611, (84 Stat 1830), Rivers and Harbors Act of 1970. This act authorizes the Secretary of the Army to review the operation of existing Corps projects and recommend to Congress modification of their structure or operation to improve the environment.

c. Section 6, Flood Control Act of 1944, provides the authority for the Secretary of the Army to make contracts with states, municipalities, private concerns, or individuals at such prices and on such terms deemed reasonable for domestic and industrial uses for surface water that may be available at any reservoir under the control of the Department of the Army.

d. ER 405-1-12, "Real Estate Handbook," 20 November 1985. Provides guidance for issuing an appropriate real estate instrument for water withdrawal users who will be installing water lines or other facilities or equipment.

e. ER 500-1-1, "Emergency Employment of Army and Other Resources, Natural Disaster Procedures," 21 December 1983. This ER identifies the mission, authorities, responsibilities, and chain of command of the Corps in provision of disaster assistance. Specifically it establishes guidance in the application of PL 84-89 and PL 95-91 and sets reporting and assistance request procedures.

f. ER 1110-2-240, "Water Control Management", dated 8 October 1982. This regulation prescribes the policies and procedures to be followed in water management activities including special

regulations to be conducted during droughts. It also sets the responsibility and approval authority in development of water control plans.

g. ER 1110-2-1941, "Drought Contingency Plans", dated 15 September 1981. This regulation provides policy and guidance for the preparation of drought contingency plans as part of the Corps of Engineer's over-all water management activities.

h. ETL 1110-2-251, "Preparation of Water Control Manuals", dated 14 March 1980. This document provides a guide for preparing water control manuals for individual water resource projects to include drought contingency plans.

i. EM 1110-2-3600, "Management of Water Control Systems", 30 November 1987. This regulation requires that the drought management plan be incorporated into the project water control manuals and master water control manuals. It also provides guidance in formulating strategies for project regulation during droughts.

j. Multiple memorandum, CECW-RP, 11 Jul 88, subject: Request for Withdrawal of Small Amounts of Water over Short Periods of Time. Drought and other emergencies affecting domestic, municipal, and industrial water supplies will likely generate requests for water stored in Corps reservoirs. This memo outlines an expedited process for dealing with such requests that can be included in drought contingency plans. District Commanders should take the initiative to make Section 6 assessments, Flood Control Act of 1944, of the availability of storage for limited withdrawals (up to 50 acre-feet of water may be allocated by the District Engineer in accordance with EC 1105-2-181). Agreements for small amounts of water withdrawals (50 acre-feet or less) may be accomplished at the District level for a term of no more than one year and a clause may be included for an automatic renewal.

k. Multiple letter, CESWD-ED-WR, dated 8 June 88, subject: Drought Contingency Plans. This letter directs the Districts within the Southwestern Division to initiate preparation of drought contingency plans for their basins and projects.

III. DROUGHT IDENTIFICATION

3-01. Historical - Describe historical drought(s) which have occurred in the basin.

3-02. Severity - Provide a general description of a severe drought and parameters that will effect actions to be taken. The Palmer Index should be used as one parameter for basin conditions and/or actions to be taken. The parameter for triggering actions at individual projects should be based on pool elevations. Note: Severity action levels should not be described here. However, a general discussion may be given with reference to Section VII (Drought Management Plan) for details.

IV. BASIN AND PROJECT DESCRIPTION

4-01. Basin Description - General characteristics of the basin water supply and use; a mass balance on basin supplies would be helpful. Description should include physical constraints, i.e., water supply and minimum channel flow, water transfers into and out of the basin, etc.

4-02. Project Description - Description along with other pertinent information should include physical constraints, i.e., water supply and power intakes, minimum hydropower requirements, boat ramps, etc.

V. WATER USES AND USERS

5-01. Current Project Water Uses and Users

a. Uses - Describe current uses of project waters (stored water and releases) within the basin. Differentiate between authorized project purposes and uses.

b. Users - List Users and their priority to use. Identify those that have downstream water rights.

5-02. Potential Project Water Uses and Users

a. Uses - Describe potential project water use which might be used during a drought.

b. Users - List potential Users and estimated water use.

5-03. Available Storage Surplus or Current Needs. Identify and quantify storage in excess of current uses.

VI. CONSTRAINTS

6-01. Constraints - Identify, in general, both legal and institutional constraints that could constrain potentially available water resources. These include interstate compacts, state laws, water rights, operating procedures by river authorities and other entities.

VII. DROUGHT MANAGEMENT PLAN

7-01. General

a. General Concept of the Plan. The Drought Management Plan presents a broad outline of actions necessary to effectively manage the District's water resources during time of shortage. The actions of the District will be broadly related to the level of drought severity. While it is recognized that severity of impacts may be widely variant among the water user groups, the District has established severity action levels which are related both to the general impacts of the drought and to deficit moisture balance accounting as calculated by the NWS.

b. General Description Levels. The four action levels as described below are used to give District managers a basic framework with which to execute a drought response.

ACTION LEVELS

Level I. This level is designed as an alert phase in which the Water Managers monitor the onset of an apparent drought situation. The plan requires normal operational procedures and coordination for monitoring of storages, users, releases, etc., required to perform normal low flow activities and disseminate status reports within the Corps, other agencies, and users.

Level II. The plan calls for expanding actions ongoing in Level I. In addition, a Corps Drought Management Committee (CDMC) will be activated. As needed, the requests and actions related to water management will be coordinated through the CDMC to assure the various functional elements of the District are responding to the drought in a coordinated and concerted effort. Requests for drought-related actions will be forwarded to the CDMC for its evaluation and recommended actions. The CDMC will coordinate requests and actions with appropriate State and Federal agencies. The Reservoir Control Section coordinates and carries out the plans and deviations through their routine command channels.

Level III. During this phase of the drought, the District engineer will activate the Interagency Drought Management Committee (IDMC) as the interface between the CDMC and the water user's needs in the basin as represented by the committee members. The IDMC will provide user input and coordinate the State and Federal positions on drought actions. This committee will provide the CDMC with justifications, priorities and suggested actions which will serve the most critical needs with the remaining project storage.

Level IV. The level IV actions will exist when the remaining project conservation storage is about 10 percent. Coordination of actions during this level will follow the same procedures as in Level III, but by Level IV conditions have worsened to the extent that inactive storage utilization must be considered. Water rationing and apportionment may be required to maintain critical water needs.

7-02. Drought Management Committees,

a. General. A Corps Drought Management Committee (CDMC) and an Interagency Drought Management Committee (IDMC) will be established for the purpose of coordinating procedures and communicating actions that will be required by the drought management plan. It will be essential that the plan provides for good lines of communication within the Corps as well as the State and Federal agencies, and with the public concerning current and forecasted drought conditions at Corps lakes.

b. Corps Drought Management Committee (CDMC). This committee will coordinate and direct all water management activities of the District during drought situations. The following list provides names of District elements to be used in selecting members for the CDMC.

District Commander

Chief of Engineering Division

Chief of Planning Division

Chief of Real Estate Division

Chief of Operations Division

Chief of Construction Division

Office of Counsel

Emergency Management

Safety Office

Public Affairs Office

Contracting

c. Interagency Drought Management Committee (IDMC). A broader based committee consisting of representatives from various State and Federal agencies should be established for the purpose of providing input into the Corps decision-making process in regard to the use of water in the best interest of water user groups and the general public. The following is a list of both Federal and State agencies that may be used in developing membership of IDMC.

Federal:

Corps of Engineers

Southwestern Power Administration (SWPA), (*i.e., Power Marketing Agency*)

Fish & Wildlife

Environmental Protection Agency

National Weather Service

U.S. Geological Survey

Bureau of Reclamation

Compact Commissions

Soil Conservation Service

State:

Fish & Wildlife

Water Resources Division

River Authorities

Department of Agriculture

State Health Department

Representative of Governor's Office

Emergency Services

Parks and Tourism

Water Rights Commission

Irrigation Districts

Water Supply Association

7-03. **Drought Management Procedures.** During drought conditions specific procedures and actions are necessary in order to implement the drought management plan. The following table presents the required actions for each level of drought severity.

ACTIONS:

Level I

Reservoir Accounting of Conservation Storage (Monthly)

Notify State Fisheries for Management Purposes

Low Flow Releases

Monitor Drawdowns

Notification of Usage

Hydropower meeting with SWPA

Monitor Excessive Gate Leakage

Level II

Activate CDMC (Meet Monthly)

Reservoir Accounting of Conservation Storage (Monthly)

Notification of Usage

Forecast Lake Levels

Notify Public through PAO of Safety Hazards

Hydropower Meeting with SWPA (Limit Hydropower Production to Project Yield)

Consolidate Special Event Releases

Notify Users of Intake Invert Releases

Verify Flow Rating Tables

Potential Use of Flood Storage

Reduce Gate Leakage

Level III

CDMC meet weekly
IDMC (Activate) Meet Monthly
Reservoir Accounting of Conservation Storage (Weekly)
Notification of Usage (Letter)
Forecast Lake Levels
Notify EOC
Minimize Special Event Releases
Report Usage Weekly
Define Additional Surplus Water

Level IV

CDMC Meet Weekly
IDMC Meet Weekly
Reservoir Accounting of Conservation Storage (Weekly or Less)
Notification of Usage (Letter)
Forecast Lake Levels
No Special Event Releases

VIII. INTERAGENCY COORDINATION AND PROCEDURES

8-01. Interagency Coordination. Describe and prepare flow charts, if required, outlining major coordination activities with other Federal or State agencies that would be required to implement the drought contingency plan.

8-02. Technical Procedures. Describe procedures and approval authority for water supply contracting, i.e., procedures and approval authority for requests for withdrawals of small amounts (50 acre-feet or less) of water over short periods of time.

IX. PUBLIC INFORMATION

9-01. Describe ways in which information will be disseminated to the general public including statements prepared in accordance with ER 1110-2-240, ER 1110-2-1941, and EM 1110-2-3600.

X. RESPONSIBILITY

10-01. The _____ District Reservoir Control Section is responsible for the preparation, revision, and implementation of the subject Drought Contingency Plan. The Reservoir Control Center of the _____ Division will have the responsibility for review and approval.